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feel in the productions of our fair country-women. So much have they cultivated it of late, that they seem almost to have taken possession of the whole domain of light literature, as if it were theirs by a peculiar and exclusive right. Novels and poems are continually coming from their pens; and, what is of far higher consequence, there is a heartiness, a sincere and unsophistical naturalness and tenderness in most of them, that has by no means characterized all the writings of the same class, from female pens in past times. We hope that, in this respect, they may go on as they have begun.

ART. VIII.—1. *Practical Observations on Popular Education.* By H. BROUGHAM, Esquire, M. P. F. R. S.

2. *Library of Useful Knowledge.* Published under the Superintendence of the Society for the Diffusion of Useful Knowledge. H. BROUGHAM, Esquire, M. P. F. R. S. Chairman of the Committee.

THE first named of these works, was published about four years ago, and has already gone through between twenty and thirty editions.* It will undoubtedly go through many more in Great Britain. We hope its circulation will be no less extensive in this country. We earnestly wish that all the readers of this article may be induced to procure and read the pamphlet, if they have not already done it. They will find in it the outlines of a vast project for the intellectual improvement of the lower classes of society, drawn with that clearness which is a distinguishing quality of the author's mind, and recommended by arguments, which to us, at least, seem irrefragable. They will find, too, what is not always an ingredient in the speculations of great minds; namely, plain common sense. There is no pomp, no declamation, no rhapsody; but on every page, and almost in every sentence, there are opinions and suggestions, so obviously wise and weighty, and yet so simple, that while the reader is delighted with their excellent sense, he is almost provoked that he did not think of them himself.

To meliorate the condition of the working classes by imparting new light to their minds, has long been a darling object

* See North American Review, No. 52, for July, 1826.

with Mr Brougham. But absorbed as he has been, in the pursuits of a crowded and aspiring life, he could only devote to it those fragments of time, which most other men think not worth gathering up. The pages of which we are speaking, he tells us, were written in 'time stolen from needful rest.' How greatly does this consideration enhance their value in the eye of the philanthropist. With what supreme satisfaction does the mind contemplate the vigils of a great man, consecrated to objects of benevolence.

It has been said by men of high authority among us, that Mr Brougham, and the distinguished men who have coöperated with him, have only imitated, after the lapse of more than a century, the example set by our Pilgrim fathers. Now admitting this were true, it would not take away one particle of the essential merit of the reformatorys in Great Britain; for it is their vast utility, and not their originality, that makes them so worthy of encomium. But it is not true. There is no part of the plan discussed in the work before us, which has any considerable resemblance to our system of free schools. Would to Heaven that these noble institutions had been imitated, both in England and elsewhere. This, however, is not the case. If they are not inimitable anywhere else, they are as yet unimitated, and are the peculiar heritage of New England. But let not the pride we take in our provisions for education stand in the way of justice. Let us frankly and gladly own, that whatever there is among us resembling the plan in question, has been copied from our transatlantic brethren. At least there is but one exception to this, and for that Mr Brougham has given us due credit. We refer to the organization of the 'Library Company of Philadelphia.' Mr Brougham alludes to it thus; 'The Mechanics' and Apprentices' Library at Liverpool, established in 1823, comes ultimately, if I mistake not, from a very illustrious stock; for it was formed upon the model of the plans which owe their origin to the Library Company of Philadelphia, founded by Franklin, in 1731, and incorporated in 1742.' Nor is this the only instance in which Mr Brougham has paid a just tribute to our illustrious countryman. We shall quote the concluding paragraph of his 'Observations.'

'To the working classes I would say, that this is the time when, by a great effort, they may secure for ever the inestimable blessing of knowledge. Never was the disposition more universal among the rich to lend the requisite assistance for setting in motion the

great engines of instruction ; but the people must come forward to profit by the opportunity thus afforded, and they must themselves continue the movement once begun. Those who have already started in the pursuit of science, and tasted its sweets, require no exhortation to persevere ; but if these pages should fall into the hands of any one at an hour for the first time stolen from his needful rest after his day's work is done, I ask of him to reward me (who have written them for his benefit at the like hour) by saving threepence during the next fortnight, and buying with it Franklin's Life, and reading the first page. I am quite sure he will read the rest ; I am almost quite sure he will resolve to spend his spare time and money, in gaining those kinds of knowledge, which, from a printer's boy, made that great man the first philosopher, and one of the first statesmen of his age. Few are fitted by nature to go as far as he did, and it is not necessary to lead so perfectly abstemious a life, and to be so rigidly saving of every instant of time. But all may go a good way after him, both in temperance, industry, and knowledge, and no one can tell before he tries how near he may be able to approach him.'

We shall now state, in as brief terms as we can, in what the plan of popular education proposed and illustrated in the works before us consists. The position assumed in the beginning is, 'that there is no class in the community so entirely occupied with labor, as not to have an hour or two every other day at least, to bestow upon the pleasure and improvement to be derived from reading ; or so poor, as not to have the means of contributing something towards purchasing this gratification.' Respecting these assumptions, we have only to remark, that if they are true of the laboring classes in Great Britain, they are true *a fortiori* of the same classes in this country, labor being compensated here so much more munificently.

The difficulties to be encountered arrange themselves under these two heads, want of money and want of time. First, want of money to procure the requisite books and instruction ; and secondly, want of time to go through such books and receive such instruction, as are suited to conditions of greater leisure. How then are these difficulties to be obviated ? The first expedient proposed by Mr Brougham is, to promote, by every possible means, *the publication of cheap books*. He says that the price of books is out of all proportion to that of other articles of manufacture, being three times as great in London as in Paris. If an Englishman may reasonably complain of the price of books, what may not an American say ? Let us then, for our own

interest, attend to the remedies proposed. The causes of the high price of books in England are four, namely, the high expense for labor where so little is done by machinery; the direct tax upon paper; the employment of paper more costly than is necessary; and the aversion to crowd the page or narrow the margin. All but the second exist in this country, and to at least as great an extent as anywhere in Europe. The first we may not hope or desire to remedy, any faster than new inventions and applications of machinery may do it. But the two last, namely, expensive paper, and large type with a wide margin, may be remedied. Why may not we content ourselves with the same style of printing, and the same quality of material, as satisfy the readers of France and Germany? where a library may be purchased at less than one third of what the same books would cost if printed here. *Retrenchment*, for certain reasons which we need not mention, has become a hackneyed word in this country; but if it be necessary anywhere, it is in the cost of books; and it is for the interest of every scholar who would not become a beggar, to insist strenuously upon it. We have no doubt that it would be both a needful and profitable speculation, to establish a press for the express purpose of publishing the most popular works, in a form much cheaper than they can now be found. We could wish that some enterprising publisher would take this into consideration.

In Great Britain, what is here proposed has been actually executed. Hume's History, which formerly cost nine dollars, may now be had for four dollars. The price of Franklin's Life and Essays is reduced to twenty-five cents. (Here the cheapest edition costs fifty or sixty cents.) Cook's Voyages complete, with many good engravings, may be had for one dollar and fifty cents. These instances are sufficient to show the possibility of a great reduction in the present price of common books. But the friends of popular education in Great Britain did not content themselves with cheaper editions of books already in circulation. They organized themselves into a *Society for the diffusion of useful knowledge*. A numerous committee was chosen, in which we find many of the first names of England, Scotland, and Ireland. Of this committee Mr. Brougham is chairman. Under their superintendence was commenced, in 1827, a series of works under the name of the *Library of Useful Knowledge*. We have placed this title second at the head of this article, and before we dismiss the subject, we intend to say something respecting the merits of these pub-

lications, as treatises on the various branches of science. But at present we are chiefly concerned with their cheapness. They come out in numbers consisting of thirty-two closely printed octavo pages, one every fortnight. The price in London is *sixpence* (about eleven cents) per number. The price here is twelve and a half cents per number. This surpasses, in point of economy, anything we had before supposed possible. A complete treatise on Arithmetic and Algebra costs only twenty-five cents, about *one seventh* of what we are daily paying for a school-book. For another twenty-five cents, we have a complete treatise on Geometry; for a third, a complete treatise on Mechanics, with an ample number of plates exceedingly well engraved; and for a fourth, a complete treatise on Hydrostatics, having the requisite number of plates neatly executed. Thus for *one dollar* we have, brought to us across the Atlantic, what we have never been able to procure, in this country, for less than seven, or at the lowest possible estimate, six dollars. And we might still go on enumerating treatises of Geography, Physiology, Electricity, History, Biography, and so on through the various departments of useful knowledge; all equally well executed, and all furnished at the same trifling expense. Nor will the Society stop at the boundaries of useful knowledge. Arrangements have been made by this enterprising body for publishing a *Library of Entertaining Knowledge*. This has already been commenced; it is published upon the same plan as the other, namely, in numbers semi-monthly, and at the same *almost nothing* of expense.

This is laying open to the poor a highway to knowledge, which before could only be approached by paying an enormous toll. The method of publishing in numbers is admirably adapted to the circumstances of the laboring classes. In the first place, they do not feel the expense so much, when they only pay twelve cents at a time. It is but six cents per week, and this can be very easily saved from one week to another, though it might not seem so easy to hoard it up for six months or a year, until it become sufficient to purchase a large work. And again, it exactly meets the wants of small *library associations*. The tracts being in a pamphlet form, there is no need of any expense for binding; a paper covering sewed on strongly, is amply sufficient to preserve them. Besides, a single set of these pamphlets will suffice for a great number of readers, as it is not necessary that all should begin with the same num-

ber, or preserve the same order in their reading. We shall not extend our remarks on this part of the subject; for the advantages of the system are so directly obvious, that a bare statement is enough to enforce conviction. In the words of Mr Brougham, 'those who have not attended to such matters, would be astonished to find how substantial a meal of information may be had by twopenny-worths.'

The next object to be effected, in order to bring the means of education within the reach of the laboring classes, is to diminish as much as possible the expense of *instruction*. For this purpose, Mr Brougham recommends the formation of *clubs* or *associations*, in which each individual shall contribute his share of the expense, whether it be for instruction, books, or apparatus. If a considerable number thus join their forces and make common interest, the burthen will not fall very heavy upon each laborer, even if we suppose no extrinsic aid to be given, and if every lecturer or teacher requires to be paid. But in not one case in a hundred, would either of these suppositions need to be made. No benevolent individual, to whom, in casting the lots of humanity, a larger portion had fallen than to those around him, would see men thus conspiring and struggling after knowledge, without lending them a helping hand. Such efforts would 'plead like angels, trumpet-tongued,' and almost force the miser to unclench his grasp. The rich are with good reason averse to helping the poor, when the poor manifest no disposition to help themselves, and so pensioning indolence and listlessness. But resolute exertions on the part of the poor would be almost sure to call down donations from the rich. This probability amounts so nearly to a certainty, that Mr Brougham counts confidently upon it as one of the means of overcoming the difficulties in the outset, when the burthen will fall heaviest. He enumerates a multitude of instances in which the opulent had manifested not only their willingness but their strong desire to join with laborers in promoting this noble object. Speaking of the London Mechanics' Institution, which was organized in 1823, on a very extensive scale, he tells us that the sum required for the buildings, exceeding three thousand pounds, 'was generously advanced by Dr Birkbeck, to whom [for his exertions in the cause of popular education, as he observes in another place] the people of this island owe a debt of gratitude, the extent of which it would not be easy, perhaps in the present age not possible, to describe.' He also pays the following elegantly turned

compliment to Sir Francis Burdett ;—‘ I should mention with greater admiration the gift of a thousand pounds from Sir Francis Burdett, but that those who know him and who mark his conduct, have so long since become accustomed to such acts of wise and splendid benevolence, that they cease to make us wonder.’

We cannot reckon with quite so much assurance upon extrinsic and voluntary aid in the way of lecturing and teaching, because individuals competent to give instruction are not so numerous in any community as those who are competent to give money ; to say nothing of the many, who, in giving such gratuitous instruction, would be cutting off the hand that feeds them. Still many persons might be found, who would *possess* the requisite knowledge, and who could *afford* to give it ; and many such might be expected to volunteer their aid. But we will not use our own words, when we can borrow with so much advantage those of Mr Brougham.

‘ Although much may be done by the exertions of individuals, it is manifest that a great deal more may be effected by the labors of a body, in furthering this important measure. The subject has for some time past been under consideration, and I am not without hopes of seeing formed a society [it will be remembered that this was written two years before the formation of the Society of which we have been speaking] for promoting the composition, publication, and distribution of cheap and useful works. To qualify persons for becoming efficient members of this association, or coöperating with it all over the country, neither splendid talents, nor profound learning, nor great wealth are required. Though such gifts, in their amplest measure, would not be thrown away upon so important a design, they are by no means indispensable to its success. A well informed man, of good sense, filled with the resolution to obtain for the great body of his fellow creatures, that high improvement which both their understandings and their morals are by nature fitted to receive, may labor in this good work, either in the central institution or in some remote district, with the certainty of success, if he have only that blessing of leisure for the sake of which riches are chiefly to be coveted. Such a one, however averse by taste or habit to the turmoil of public affairs, or the more ordinary strifes of the world, may in all quiet and innocence, enjoy the noblest gratifications of which the most aspiring nature is susceptible ; he may influence, by his single exertions, the character and the fortunes of a whole generation, and thus wield a power to be envied even by vulgar ambition for the extent of its dominion—to be cherished by virtue itself for the unalloyed blessings it bestows.’

For small towns and villages, where only a few persons can associate themselves together, it is recommended that an experienced teacher be employed to go from place to place; and it is observed that 'the man qualified for the task, who should fastidiously reject so useful and so honorable an occupation, might be a man of science, but would little deserve to be called a philosopher. No talents and no acquirements are too great to be thus applied; and no use to which parts and learning can be put is more dignified.' But before long, the association would, in a great measure, furnish its own teachers. Some individuals, from having more leisure or better capacity than others, would necessarily make greater proficiency, and these would take both pride and pleasure in imparting of their store to others. This is not mere conjecture; it has been realized. In the Edinburgh School of Arts, a joiner *who received his instruction there*, became an accomplished and acceptable teacher of Mathematics. In the Glasgow Association, a mechanic paid back what he had borrowed from the institution, by lecturing on Geography, Chemistry, and Mechanics. Indeed the opportunity and inducement afforded for *mutual instruction* should be considered as a motive for forming such associations, second in importance only to the accumulation of funds. It is introducing the division of labor where it may be employed to as much advantage as in any of the manual arts. It is making use of the social lever to lift a weight too heavy for individual strength.

As to the *apparatus* necessary for instruction and illustration, the burthen would be chiefly felt at the outset. Once procured, it would last a long time, and would not be a constantly returning tax, at least to any great degree. Nor is the cost at first so great as we might imagine. Mr Brougham, whose competency to judge on this subject is unquestionable, estimates the necessary expense of an apparatus for a course of lectures at the small sum of twenty pounds. We shall again borrow his own words.

'In estimating the expenses I have supposed a room to be hired, and the rent to be moderate. To make a beginning, the parties must make a shift with any public room or other place that may be vacant; the great point is to begin; the numbers are certain to increase, and the income with the numbers, as the plan becomes known and its manifold attractions operate upon the people. For the same reason I reckon a small sum for apparatus. Great progress may be made in teaching with very cheap and simple exper-

iments. Indeed, some of the most important, if not the most showy, are the least costly and complicated. By far the grandest discoveries in natural science were made with hardly any apparatus. A pan of water and two thermometers were the tools that in the skilful hands of Black detected latent heat: a crown's worth of glass, three penny-worth of salt, a little chalk, and a pair of scales, enabled the same great philosopher to found the system of modern chemistry, by tracing the existence and the combinations of fixed air; with little more machinery the genius of Scheele (a working chemist) created the materials of which the fabric was built, and anticipated some of the discoveries which have illustrated a later age; a prism, a lens, and a sheet of pasteboard enabled Newton to unfold the composition of light, and the origin of colors; Franklin (a working printer) ascertained the nature of lightning with a kite, a wire, a bit of riband, and a key.—Even the elements of Mechanics may be explained with apparatus almost as cheap and simple. To take one instance; the fundamental property of the lever (and I may say of the whole science) may be demonstrated by a foot rule, a knife, and a few leaden balls of equal size.'

We cannot in this country place the estimate for apparatus quite so low as that of Mr Brougham. The little demand hitherto existing has created no competition in the making; indeed it has hardly been sufficient to induce a solitary individual to make such manufacture an exclusive occupation. Ten years ago scarcely an article of apparatus could be found in our collections, which was not of foreign fabrication. And we doubt if, at this moment, all the parts of a complete apparatus could be made here at any price. But this evil will be every day diminishing. The formation of Lyceums and Mechanics' Associations will increase the demand, produce competition, lower the price, and perfect the workmanship. We may also anticipate great simplification in the construction and an improved economy in the materials. 'There cannot be a doubt,' says the author before us, 'that a compendious set of machines may be constructed to illustrate at a very cheap price a whole course of lectures.' 'A friend of mine is at present occupied in devising the best means of simplifying apparatus for lectures upon the mechanical powers; and cheap chemical laboratories may then receive his consideration.' And why, we ask, may not something of the same kind be done in this country? Neither inventive genius nor manual skill is wanting; and at this moment, such an undertaking would meet with due encouragement. It would ensure not only compensation, but gratitude. A greater

benefit could hardly be conferred upon science. But even supposing no improvement in this respect, a beginning may be made with a very few articles and such as can be readily procured. An air-pump, an electric machine, a prism, a lens, a magnet, a small galvanic battery, a blow-pipe, some retorts and crucibles, a thermometer, a small metallic lever, a set of pulleys, a wheel and axle, and a cheap planetarium, would be sufficient to illustrate all the most important principles of natural science.*

With regard to the formation and direction of these associations, it is said to be a 'fundamental principle to make the expenses be mainly defrayed by the mechanics themselves; it is another principle equally essential, that they should have the principal share in the management.' It is recommended that at least two thirds of the standing committee of management be from the working classes. As a general principle, they will manage any concern best, who have the deepest interest involved in it; and in cases of doubt or difficulty, they can readily and will naturally take advice of the more experienced and better informed. Gratitude for disinterested aid will prompt them to this. But on the other hand, if the mechanics be not intrusted with the chief direction of affairs, there will be a constant sense of inferiority connected with a jealousy, always too ready to be excited, which would be of all things the most to be deprecated. The policy of an annual assessment upon the members is equally obvious. That which costs nothing is too apt to be considered as worth nothing. But if the mechanics are required to pay a trifle for the instruction they receive, they will be eager to get their penny-worth. We have heard of a man who would eat when he was no longer hungry, merely because he had paid for what was set before him.

Thus we have given a general outline of those popular institutions, under various names, which, within the last six years, have spread themselves over every part of the British Islands, and poured floods of intellectual light upon the lower ranks of society. What a glorious commentary upon the practical wisdom in

* Since this article was furnished, Mr Josiah Holbrook, of Boston, has advertised that he is prepared to furnish apparatus for lectures on mineralogy, electricity, galvanism, geometry, hydrostatics, astronomy, chemistry, and mechanics; a full apparatus for illustrating the five last named branches costing but fifty dollars. We have also learned that a variety of machines are in process of construction in the same city, designed to illustrate the most important applications of philosophy to the arts.

which they originated ! Their present flourishing state bears equally honorable testimony to the high tone of public feeling. This they could not owe to a single individual however gifted ; it could have been realized only by the united exertions of thousands of enlightened individuals, and of thousands more who desired to be enlightened. Herein, they have given a noble lesson to other nations ; and we take pleasure in paying them the tribute of unfeigned admiration.

We now turn with satisfaction to notice the progress, which institutions similar to those we have been considering, have made in this country, and especially in our immediate neighborhood. From the view we have taken, it is obvious, as was stated in the beginning, that they have nothing in common with our *free-school* system. They take up popular education, where free schools leave off, and carry it through the higher stages. Persons who have derived most benefit from the one, are best qualified to derive benefit from the other ; those sow the seed, these mature the plant. Reading, writing, grammar, geography and arithmetic, which comprise the substance of what is taught in free-schools, are merely the alphabet of education, considered with reference to Lyceums. We insist upon this, because a want of zeal on the subject of Lyceums, has been sometimes defended by saying, that the means of popular education provided in New England, are already ample enough.

The Mechanics' Institution, established about two years ago in Boston, was an early and praiseworthy imitation of the example set beyond the Atlantic. At the opening of this excellent institution, the nature and merits of the plan were ably set forth in the Address delivered by Mr George B. Emerson ; to which we refer our readers for a mass of interesting facts relating to the history of such institutions, and an eloquent illustration of the advantages to be derived from them. The example of Boston was speedily imitated in various other parts of the same state and of the states adjoining. It is believed that as many as one hundred of these associations are now in operation in Massachusetts. We mention one very recently organized on a liberal and extensive scale at Northampton, because its experience confirms what we have alleged in another part of this article, namely, that it would not always be necessary to *hire* lecturers. Not less than eighteen gentlemen have pledged themselves to lecture *gratuitously* in this Lyceum, where a lecture is to be given every week, without regard to seasons.

But great as has been the zeal hitherto displayed, much yet remains to be done. The object is of such importance, and the means of accomplishing it are so easy, that there should not be a single town or village, however small, without a popular Lecture, or something of that nature. While the best interests of humanity are concerned in the multiplication of such institutions, they are happily not exposed among us, to objections which elsewhere have been urged against them. Elsewhere, schemes for a universal diffusion of knowledge have been regarded with jealousy on account of their supposed inconsistency with a subordination of ranks, essential to the well-being of society. The inferior classes,—it has been the plea,—are contented with their present condition; but if they were enlightened, they would become discontented and aspiring, and would, in consequence, be really less happy than they now are. In our country,—recognising, as its whole social condition does, the great principle of equal rights,—the universal right to knowledge, and to the elevation, and pleasures, and power which it gives, is not subject to be disputed. And indeed nowhere is the objection capable of being sustained. The experiment, in the first place, having never been fairly made, its supposed results are to be set down for nothing but conjecture. But admit that the lower classes would become ambitious and aspiring, and what follows? Simply that those who now have the superiority and would still maintain it, *must themselves strive and aspire too*, a result of all things the most desirable to have produced. For then the whole mass of society will make a positive advancement; there will still be the same gradations of condition, because each class will be elevated in the same proportion. And thus the objection converts itself into one of the strongest arguments.

There is, however, on some minds, an impression that it is in vain to think of giving laborers a scientific education; and by way of confirmation of this view, it is remarked how few, even of those who have most leisure and means, attain to anything like a general acquaintance with the principles of science. We admit the fact, but deny the conclusion. This very leisure is often the most fatal hindrance to improvement. From the corporeal inaction and sensual indulgence, which are the too frequent consequences of leisure, a habit of intellectual somnolency is generated and gradually confirmed. But there is less danger of this among the laboring classes. Their minds are generally active enough, but the misfortune is, that this activity

has not hitherto been directed to good purpose. It is admitted that they cannot have a great deal of time for study ; but is this a reason why they should not improve what they have ? Does it not, on the contrary, afford the best possible assurance that this time will be well improved ? While the rich man wastes pound after pound because he has many more, the poor man husbands his penny because it is his all. So may it be expected to be with leisure. Besides, it is not contemplated to traverse with the laborer the whole field of scientific investigation. It is only intended to put him in possession of the results. To illustrate our meaning by an example. In teaching astronomy by popular lectures, it is not necessary or desirable that the lecturer should go back to the age of Ptolemy or beyond, and trace the history of the science downward. He need not mention a single one of all the hypotheses that have been entertained. The names of Copernicus, Galileo, Kepler, Tycho Brahe, Newton, Herschell, and Laplace, need not once be pronounced, while placing before common minds a distinct idea of the mechanism of the heavens. All the grand outlines of astronomy, with reasons and illustrations made level to the most moderate capacity, may be brought within the compass of half a dozen lectures. The numberless and intricate details which grow out of *nutation*, *aberration*, and *disturbances*, ought to be omitted in such lectures, even if on the lecturers' part they could be embraced as well as not. They would confuse and embarrass, instead of aiding the understanding. Let the subject be set forth in its sublime simplicity, and the machinery of the solar system will be comprehended with as little difficulty as that of a watch or a steam-engine. To any other branch of natural science, similar remarks might be applied. Any sensible mechanic, who had never heard of electricity, might be made to understand completely, in the space of two hours, the nature and value of the grandest discovery ever made in that science, namely, the identity of lightning with the electric spark ; and the way in which the lightning-rod operates to guard an edifice from its tremendous effects. The reason why treatises on the subject are amplified over so wide a surface, is, that one third of the book is taken up in discussing the merits of various hypotheses, and at least another third in the description of instruments for conducting experiments ; all of which are interesting and useful in their place, but would not be necessary in such a course of instruction as we have in view.

The plan, therefore, as it seems to us, so far from being visionary, is perfectly rational and feasible.

We shall now consider some of the recommendations which the *Library of Useful Knowledge* possesses, in addition to its cheapness. Having already counted largely on the patience of our readers, this view will be very summary. One general remark is, that being professedly written for the instruction of persons little informed, the style of reasoning and illustration is for the most part, much more plain and familiar than we usually meet with. The stiffness and formality of technical language is laid aside whenever it can be done, and a manner more resembling conversation is adopted. The reader is properly addressed as one, as yet, uninformed upon the subject before him, and consequently needing all the helps which can be derived from familiar terms, comparisons, and analogies. This will pass for no slight merit with those who consider how liable writers upon scientific subjects are, to fall into the error of supposing that what is perfectly clear to their own minds, without illustration, will be equally so to the minds of their readers. They see no difficulty, why should others? To them a technical nomenclature is a help; and they forget that, without frequent explanation, it may be a dead letter to the uneducated reader. Franklin, in his philosophical essays, avoided this error more completely than any other man, whose works we have seen; these essays may be regarded as perfect models of a neat, easy, and perspicuous philosophical style. None of the treatises before us come quite up to them, in this kind of excellence; but, if we are not led astray by an accidental resemblance, they were the mark at which several of the writers pretty successfully aimed.

The series is introduced by a preliminary discourse on the *Objects, Advantages, and Pleasures of Science*, which, in less than two years, has passed through eight editions, amounting probably to more than a hundred thousand copies. It illustrates in a masterly manner, the bearings of the various branches of science upon the business and happiness of life. Whoever may be its author, it is too far removed from the pedantry of science, and too replete with practical common sense, to be the work of an ordinary mind. It not only evinces an extensive acquaintance with every branch of science taken individually, but also much profound and philosophical reflection, upon the most important relations which the various branches bear to

each other, and to the human understanding. It is sent out as a lure to induce men to attend to what follows. It awakens a curiosity, which can only be gratified by persevering inquiry. If these remarks shall induce an individual to purchase and peruse the preliminary tract, they will have accomplished their object ; for we are sure the reader will not rest here. Having arrived at the door of nature's great museum, and caught a glimpse of the rare and wonderful things within, he will press for admittance, till he has gained it.

The tract upon Arithmetic and Algebra, comprising two numbers, the seventeenth and twenty-fifth, is especially worthy of being mentioned here, because it contains an important innovation. Arithmetic and algebra are treated together, as forming *one and the same* branch of mathematics. In our view, this is a decided improvement. Algebra is nothing more than *generalized arithmetic*, and the sooner the learner is made to comprehend this the better. Once point out the distinction between letters and numbers, considered as representatives of quantity or magnitude, and then the two branches may proceed hand in hand. While teaching the pupil to add numbers, let the same operation be performed upon letters, and so on, through the whole series of operations. In this way, each process will aid and elucidate the other. It will be readily seen that the whole difference arises from the *liquid* nature, if we may so express it, of numbers. For example, if five be multiplied by eight, the two numbers *flow* together, as it were, so that in the product forty, neither of the factors five or eight appears by itself ; whereas if a be multiplied by b , these factors, wanting the liquid nature of numbers, cannot mix together in the product $a b$, but remain separate and distinct. This one distinction, running through all the operations (which are precisely the same in the two branches), explains the whole difference between them ; and a very young child may be made to comprehend it completely, by the analogy of pouring together liquids of different colors, and marbles of different colors. The first will intermix, the second will not ; you cannot ascertain the separate liquids by looking at the mixture, but you can readily separate the marbles. Just so it is with the results obtained by numbers and letters ; and with this one exception, arithmetic and algebra are the same thing. Let them then be taught together that they may help each other. In this way, time will be saved, and each will be better understood. We are fully of the be-

lief, that a child who has never studied either, may be made to comprehend both, by teaching them together, in two thirds of the time that would be required if each were taught separately. If this be true, an important change is yet to be made in our books and methods of instruction.

Another most valuable tract, forming numbers tenth and eighteenth, contains an *Account of Lord Bacon's Novum Organon Scientiarum*. This work may well be denominated the Atlas of modern philosophy, for the heaven of truth rests upon its shoulders. We are accustomed to pronounce the name of Bacon with reverence, as if he scarcely belonged to our race. But how few, comparatively speaking, have the means of appreciating the amount of his benefactions to mankind. The *Novum Organon*, by general consent the most stupendous achievement of the human intellect in its investigations of the way to knowledge, is so rare and costly a book, that many, who might desire to study it, could not procure it. Moreover, it is so abstruse from the nature of the subject, and so obscure from the want of a lucid method, that few of those who might procure it, would be able to understand it. Probably no work was ever written, which stands more in need of an able commentary to make it intelligible to ordinary capacities. These considerations render the tract before us one of the most important in the collection. It puts into the hands of the common reader, a key to treasures before inaccessible. A proof that it has been acceptable to the public, is that it has passed already through the fourth edition. We did not fully understand, till we read this, the worth of a familiar abstract of a great and difficult work; and having more than once thrown down the original in fatigue and despair, we feel personally grateful to the author of this, for his plain, and really interesting exposition. The light of a great mind has been shed over the subject, to make it so clear. Be the author who he may, every reader will be impressed with the idea, that he was fully competent to the task he has undertaken. He commences with a view of the condition in which Bacon found the world, in respect to knowledge and science; and then, carrying us along in full sympathy with his own enthusiasm, and delighted with the ease with which he enables us to master the hugest ideas of a giant mind, he prepares us to join cordially in the conclusion; 'that, by giving the inductive philosophy to the world, Lord Bacon has proved one of its most signal benefac-

tors ; and has largely done his part towards promoting the final triumph of all truth, whether natural, or moral and intellectual, over all error, and towards bringing on that glorious crisis, destined, we doubt not, one day to arrive, when, according to the allegorical representation of that great poet who was not only the admirer of Bacon, but in some respect his kindred genius, —**TRUTH**, though “hewn, like the mangled body of Osiris, into a thousand pieces, and scattered to the four winds, shall be gathered limb to limb, and moulded, with every joint and member, into an immortal feature of loveliness and perfection.” In short, if we should attempt to express half the satisfaction this essay has afforded us, we should be charged with extravagance by all who have not read it.

We were in hopes of having room to notice the *Life of Sir Christopher Wren, with a History of Architecture* ; and the *Life of William Caxton, with a History of the Art of Printing* ; but we find that if we should attempt to state our views of the different works in detail, we should not easily reach the end. The ground is by far too extensive to be traversed in the time allotted to a review. But if we could find, in the whole series, a tract possessing any striking and tangible defects, we should take pleasure in detaining the reader long enough to convince him that our abstinence from censure thus far, has not been owing to the want of a disposition to find fault, but solely to the want of a subject. Works like these, however, are the despair of critics. Professing nothing but utility, and accomplishing all they undertake ; addressing themselves to the great mass of mankind, and sent abroad in what seems the purest spirit of philanthropy ; containing stores of intellectual wealth, and yet costing less than the vilest trash that issues from the press ;—what can you do with such works, but buy them, read them, praise and profit by them ?

In conclusion, we must be indulged in a brief appeal to patriotism, in furtherance of a cause, which abler pens than ours might be well employed in recommending. We have hitherto abstained from arguments drawn from our political condition ; but they are too powerful to be passed over in silence. There is a solemn responsibility resting upon every real republican to strengthen the foundation upon which republicanism rests. This foundation is knowledge and virtue in the mass of the people. With them the physical force of the community resides ; and if the theory of our government were fully realized

in practice, they too would control its moral energies. Looking to an enlightened populace, there is nothing fearful in the thought, that they are, theoretically speaking, our legitimate and acknowledged governors. But the mind recoils with horror from the idea of submitting the most precious interests of society to the suffrages of an ignorant majority. We do not intend to affirm that a majority of our population are absolutely ignorant, for we do not so believe; on the contrary, we are sure that, compared with the mass of any other nation now existing, they must be pronounced enlightened. But knowledge and ignorance are relative terms; and, speaking with reference to that state to which well-directed efforts might speedily advance them, they are comparatively ignorant. This is not their own fault, but the inevitable consequence of their present condition. Individually their means and resources are scanty; but by union and concentration they might become ample. And when we compare the power they *might* constitutionally wield—and *would* wield, if a political convulsion should disjoin them from the salutary influence of the enlightened minority,—with the largest measure of wisdom and ability that a demagogue, in the impudence of his flattery, would dare to ascribe to them, the question of their improvement at once assumes a magnitude, which we know not how to describe. For such a crisis, however remote it may appear, it is the part of wisdom to be prepared. We have the experience of all history against the ultimate success of our great political experiment; warning us, that if we would avoid those dangers which no free government has yet survived, it must be by taking such precautions as none has ever yet taken. Let us listen reverently to this monitory voice, and take the best of all possible precautions, by diffusing intelligence far and wide among the people.

ART. IX.—*Catalogue of Pictures in the Athenæum Gallery.*
Boston. 1829.

THE exhibition of pictures, which has been open the last two months, has been attended with circumstances most gratifying to the amateur, and most encouraging to the artist. It was hardly